Supplemental Specification
2005 Standard Specification Book

SECTION 02056

EMBANKMENT, BORROW, AND BACKFILL

Delete Section 02056, 02061, 02324, 02330, and 02332 in their entirety and replace with the following: (References in other UDOT Specification Sections have not been updated.)

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Materials and procedures for construction of embankment, backfill, and bridge approach embankments.

1.2 RELATED SECTIONS

A. Section 02231: Site Clearing and Grubbing

B. Section 02317: Structural Excavation

C. Section 02912: Topsoil

D. Section 03575: Flowable Fill

1.3 REFERENCES

A. AASHTO M 145: Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes

B. AASHTO T 11: Materials Finer than 75 μm (No. 200) Sieve in Mineral Aggregates by Washing

C. AASHTO T 27: Sieve Analysis of Fine and Coarse Aggregates

D. AASHTO T 99: Moisture-Density Relations of Soils Using a 2.5 kg (5.5-lb) Rammer and a 305 mm (12 in.) Drop

E. AASHTO T 180: Moisture-Density Relations of Soils Using a 4.54 kg (10-lb) Rammer and a 457 mm (18 in.) Drop

F. UDOT Minimum Sampling and Testing Requirements

1.4 SUBMITTALS

A. Before delivering material to the project, submit:
   1. Supplier and source of materials
   2. Gradation analysis AASHTO T 27 / T 11
   3. Soil classification when applicable AASHTO M 145
   4. Maximum Dry Density and Optimum Moisture Determination
      a. Use AASHTO T 180 Method D for A-1 soils and AASHTO T 99 Method D for all other soils.

1.5 ACCEPTANCE

A. Acceptance sampling and testing of material is in accordance with UDOT Minimum Sampling and Testing Requirements.

B. Engineer reserves the right to select and test material randomly from any location at the construction site.

C. Density Requirement: Acceptance is on a lot-by-lot basis when average density is not less than 96 percent of maximum laboratory density, and no single determination is lower than 92 percent.
   1. Use AASHTO T 180 Method D for A-1 soils and AASHTO T 99 Method D for all other soils.

D. Remove any material found defective and replace with acceptable material at no additional cost to the Department.

PART 2 PRODUCTS

2.1 MATERIALS

A. Provide materials free of contamination from chemical or petroleum products for embankment and backfill placements. Materials may include recycled Portland Cement concrete.

2.2 BORROW

A. Classifications A-1-a through A-4. Meet AASHTO M 145

2.3 GRANULAR BORROW

A. Classification A-1-a. Meet AASHTO M 145

B. Non-plastic, well-graded, 3-inch maximum

2.4 GRANULAR BACKFILL BORROW

A. Classification A-1-a. Meet AASHTO M 145

B. Non-plastic, well-graded, 2-inch maximum

2.5 EMBANKMENT FOR BRIDGE

A. Granular Borrow

2.6 FREE DRAINING GRANULAR BACKFILL

A. Meet the following gradation:

Table 1

Free Draining Granular Backfill Gradation	
Sieve Size	**Percent Passing**
1-1/2 inch	100
1 inch	95 to 100
1/2 inch	25 to 60
No. 4	0 to 10

2.7 FLOWABLE FILL

A. Refer to Section 03575

PART 3 EXECUTION

3.1 PREPARATION

A. Complete clearing and grubbing and stripping and stockpiling topsoil before placing embankment. Refer to Sections 02231 and 02912.

B. Excavate and dispose of unsuitable material as directed by the Engineer.

3.2 EMBANKMENT PLACEMENT

A. Place roadway excavation or borrow in embankment section with the highest quality material in the top portion of the embankment.

B. Scarify and compact the top 8 inches of the surface to at least 90 percent of maximum laboratory density when the embankment height is 6 ft or less and the underlying ground consists of loose material.

C. Break and scarify all underlying road surfaces in so that pieces do not exceed 3 ft^2.

D. Maintain drainage.
   1. Grade and maintain the roadway to ensure adequate drainage.
   2. Maintain pipe culverts and drainage ditches, or provide temporary facilities when interrupting irrigation systems, sewer, underdrainage, etc.

E. Place an initial layer to act as a working platform over soft, wet ground when approved by the Engineer.
   1. Density specifications do not apply to the working platform.
   2. Meet density requirements for embankment placed above the working platform.

F. The Engineer inspects and accepts the working platform or foundation before embankment is placed.

G. Spread embankment materials uniformly in layers not exceeding 1 ft (uncompacted depth) and compact to an average of 96 percent maximum laboratory density before placing the next layer. Reduce the lift thickness if tests show unsatisfactory density.

H. Finish subgrade surface within ±0.1 ft of line and grade.

I. Do not use rock or pavement materials over 3 ft in any dimension. Distribute so space exists for placing and compacting embankment material between large rocks or pavement materials.

J. Do not place large rock within 1 ft of the subgrade surface. Do not allow rocks to protrude above the subgrade surface.

K. Do not use compacting equipment that causes shear failure in the embankment.

3.3 GRANULAR BORROW AND BACKFILL PLACEMENT

A. Finish granular borrow surface within ±0.1 ft of line and grade.

B. Structural Backfill Placement (includes bridges, foundation, box culverts, pipe culverts, drains and other structures)
   1. Place suitable backfill material in structural backfill sections. Refer to Section 02317.
      a. Use granular backfill borrow when specified.

2. Use appropriate compaction equipment adjacent to abutments, backwalls, approach slabs, wing walls, retaining walls, and other structures.
3. Compact backfill material in 6-inch layers to a 96 percent density.

C. Free Draining Granular Backfill
1. Excavate a trench 3 inches below the underdrain pipe flow-line. Widen to 2 ft plus the outside diameter of the underdrain pipe.
2. Place free draining granular backfill in the trench and compact the bottom 3 inches with two passes of a vibratory roller.
3. Back fill to 12 inches above top of pipe with free draining granular backfill.
4. Compact backfill material in 6-inch layers to a 96 percent density when placing under a roadway.

3.4 EMBANKMENT FOR BRIDGE PLACEMENT

A. Construct approach embankments from the original existing ground up with the specified material to the limits defined herein and in accordance with DD series Standard Drawings.
1. Approach Embankments
   a) Embankment placed beneath the bridge, except riprap or other specified materials used for MSE walls.
   b) Embankment placed from the bridge abutment centerline station to a point measured at least 300 ft away from the abutment along the approach roadway centerline; and placed for embankment on the inside of abutments.
   c) Where retaining walls are located beyond this delineation, use the specified material throughout the length of the walls.
2. Intersecting Roadway Embankments
   a) Embankment placed from approximate edge of approach roadway a length of at least 60 ft along intersecting roadway centerline.
3. Adjoining Embankments
   a) When adjoining embankment is not an approach embankment, embankment placed to at least 10 ft outward from edge of approach roadway pavement.

B. Over-excavate unsuitable material (soft, springy, organic, or otherwise yielding material) at natural ground level as directed by the Engineer.

C. The Engineer inspects and accepts the working platform or foundation before embankment is placed.

D. Spread embankment materials uniformly in layers not exceeding 1 ft (uncompacted depth) and compact to an average of 96 percent maximum laboratory density before placing the next layer. Reduce the lift thickness if tests show unsatisfactory density.

E. Finish surface within ±0.1 ft of line and grade.

3.5 LIMITATIONS

A. Requirements when working during freezing or snowy conditions:
   1. Do not place embankment on frozen or snow-covered areas.
   2. Do not deliver or use frozen material in embankments.
   3. Remove snow and frozen material from embankments, foundations, and borrow areas, and furnish embankment material that can be compacted to the specified density.
   4. Remove, waste, and replace frozen embankment material at no additional cost to the Department.
   5. Measure wasted material and provide quantities to the Engineer.

END OF SECTION